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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/215,788 12/21/98 COFFMAN

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EXAMINER

TM02/0313

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ART UNIT

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3

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.  
09/215,788

Applicant(s)  
COFFMAN ET. AL.

Examiner  
Beatriz Prieto

Group Art Unit  
2152



☒ Responsive to communication(s) filed on Dec 21, 1998

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claim

☒ Claim(s) 1-28 is/are pending in the application

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-28 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☒ None of the CERTIFIED copies of the priority documents have been  
☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

*Detailed Action*

*Drawings*

1. Drawings have been objected to by the Draftsperson under 37 CFR 1.84 or 1.152, correction noted on PTO-948 is required.

*Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims **1-28** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Heil et. al. (Heil)** U.S. Patent No. **6,173,374** in view of **Angelo et. al. (Angelo)** U.S. Patent No. **6,061,794**.

Regarding claim 23, Heil teaches an access module, module including a processor(s) associated memory, and a local memory bus, and an input/output bus forming an input/output platform (IOP) access module (Fig. 1-5A, col 6/lines 34-64), module for providing input/output device access between a host system and another system (col 3/lines 64-col 4/line 29), module arranged to establish a service connection to a local (IOP) connected to a local bus using a driver module in response to a request from a remote server on a computer system network, establishing connection process comprising the steps of: beginning initialization of said driver module (col 12/lines 26-37, Fig. 4A-4D, steps 500, 510, 518, 529) which provides access to a local storage system while bypassing protocol stacks of a host operating system (providing a direct request call access while bypassing OS specific portion layer, bypassing 250, 260 access means independent of OS, Fig. 2, col 10/lines 28-65), said driver module comprising a module 180 (Local Transport) which provides direct access to the local storage device system (col 4/lines 3-20), a module 181 (Remote Transport) which interfaces to other nodes of said system network (col 4/lines 21-29, Fig. 5A

remote node N), and connection means (Connection Manager) which provides connection services and coordinating functions responsible for creating a direct call path between the Local Transport and the Remote Transport (direct path between the module 118 and the module 181 so as to provide access to input/output (117.8 and 117.9) devices driver coupled to local storage (Fig. 5A, 118) devices); searching process (scanning) to locate and initialize all local input/output platforms (IOPs) peer HBA modules, and building an IOP context directory structure (map) (i.e. descriptors and addresses of routines located with a region of memory) for each input/output platform (IOP) found responsive (col 12/lines 9-col 13/line 3); (managing, making arrangements for, i.e. preparing) means to take, be given, receive (i.e. accept) a request for a service connection from said remote server on said system network (col 11/lines 36-53, col 12/lines 9-19, Fig. 3); query via scanning means itemize responsive input/output IOP on build map (col 11/lines 53-col 65, col 12/lines 8-59), and building a descriptor structure for each IOP which includes an exported directory table having function call (col 13/lines 5-15) address pointer and characteristic parameters to support communication with the input/output platform (IOP) found (col 12/lines 9-col 13/line 13); and establishing a communication channel through the Remote Transport, which waits for an external connection from said remote server on said system network for shipping (exporting) local device access resources onto said system network using said direct call path between the Local Transport and the Remote Transport (col 10/lines 28-65).

However Heil does not explicitly teach an access module arranged to establish a service connection to a local input/output platform (IOP) running on host server of particular system area network and establishing a associated system area network management communication channel; nor module (180) arranged to provide an interface to an input/output platform (IOP) supporting an array of input/output devices is denoted "Local Transport", nor module (181) arranged to provide an interface to said another system is denoted "Remote Transport";

Angelo teaches a system/method related to direct I/O device communication, or peer-to-peer communication, wherein the I/O devices within a system communicate data between one another directly, without the involvement of the operating system, where bypassing the operating system, as is done in peer-to-peer bus architectures (col 3/lines 21-32), disclosing means for establishing communication among I/O devices running on remote computer area network systems (col 5/lines 19-40); wherein upon initialization all present I/O devices comprising a processor(s) associated memory, and a local memory bus, and an input/output bus forming an input/output

platform access module, module for providing input/output device access (col 5/lines 1-17) are determined;

It would have been obvious to one ordinary skilled in the art at the time the invention was made to modify Heil's system with means to establish a service connection to a local input/output platform (IOP) running on host server of a system network area network and establishing a associated system area network management communication channel, as taught by Angelo, implementing above mentioned modules to performed "Local Transport and Remote Transport" functions as claimed; motivation would be implement an intelligent I/O processor conforming I<sub>2</sub>O specification to support direct access to storage devices without intervention of the operating system improving data throughput and transfer speeds of the system.

Regarding claim 1, the combined teachings of Heil and Angelo as discussed above, further teach an access module, module including a processor(s) associated memory, and a local memory bus, and an input/output bus, i.e. a input/output platform access module (Heil: Fig. 1-5A, col 6/lines 34-64), module for providing input/output device access between a host system and another system (Heil: col 3/lines 64-col 4/line 29) comprising: a module (Heil: Fig. 5A, 180) arranged to provide interface (Heil: Fig. 1, 117.8, 117.9) means to an input/output platform (IOP) supporting an array of input/output (118) storage devices (Heil: col 4/lines 3-20); a module (Heil: Fig. 5A, 181) arranged to provide an interface (Heil: Fig. 5A, 120) means to said another system node (Heil: Fig 5A and 1 (151), col 4/lines 21-29); and module comprising (Heil: Fig. 5A, 171) arranged to establish connection services and to create a direct call path between the module 118 and the module 181 so as to provide access to input/output (117.8 and 117.9) devices driver coupled to local storage (Heil: Fig. 5A, 118) devices.

Regarding claim 2, the combined teachings of Heil and Angelo as discussed above, further teach wherein said IOP access module is one of a hardware module (Heil: col 11/lines 28-35), a combined hardware/software module (Heil: col 10/lines 43-50), and a software module provided on a tangible medium (Heil: col 10/lines 28-50).

Regarding claim 3, the combined teachings of Heil and Angelo as discussed above, further teach wherein said host system corresponds to a host server computer nodes of an arranged server cluster,

said another system corresponds to one remote server (Heil: abstract) with said host server and said remote servers being in a computer network (col 15/lines 22-38) arranged on a clusters computer network (Heil: col 4/lines 3-20).

Regarding claim 4, the combined teachings of Heil and Angelo as discussed above, further teach wherein said IOP which comprises: at least one or more input/output processors (Heil: col 9/lines 49-59, element (114.9); at least one storage device as said input/output devices (col 6/lines 65-col 7/line 4, col 7/lines 51-56); a device driver module arranged to control access via interface means with said storage device (Heil: col 7/line 1-56); a communication layer which defines a mechanism for communications between the Local Transport and the device driver module (Heil: col 10/lines 66-col 11/line 11, 45-53, element (240)).

Regarding claim 5, the combined teachings of Heil and Angelo as discussed above, further teach wherein said communication layer is responsible for managing all service requests (Heil: col 11/lines 36-53, col 12/lines 9-19) and providing a set of software comprising used to initiate communication with a network services via peer-to-peer communication or call services (i.e. APIs), (Heil: col 9/lines 11-18) for delivering messages, along with a set of support routines that process the messages (Heil: col 8/lines 24-49).

Regarding claim 6, the combined teachings of Heil and Angelo as discussed above, further teach wherein said communication layer comprises a message layer which sets up a communication session (Heil: col 11/lines 66-col 11/line 11, 45-53), and a transport layer which defines how information will be shared (Heil: col 10/lines 66-col 11/line 11, coordinate retrieval of shared information).

Regarding claim 7, the combined teachings of Heil and Angelo as discussed above, further teach 7. a host system, comprising: a processor (Heil: Fig. 1, 100, 117.1); an array of storage devices (Heil: Fig. 1, 118); a driver module for (shipping, transferring abroad, i.e. exporting) local storage device access onto a computer network, said driver (117) module (Heil: col 6/lines 64-col 7/line 15, 51-56), device driver col 10/lines 28-50) comprising: a device (108) driver module arranged to provide an interface (Fig. 5A, 171) to an IOP supporting said array of local storage devices (col 9/lines 27-

48); a host driver (18) module arranged to provide an interface to an operating system (Heil: abstract, col 10/lines 43-65), said host system driver module comprising a Local Transport which communicates with the device (117.8/117.9) driver module (Heil: col 9/lines 27-48), a Remote Transport which provides an interface to said computer network (Heil: col 9/lines 4-59), and a Connection Manager which establishes connection services with remote systems on said computer network (Heil: col 8/lines 24-49) and which creates a direct call path between the Local Transport and the Remote Transport to provide access to said storage devices (Heil: col 9/lines 4-26, directly connected via bus 116 to support I/O request call, col 9/lines 27-32); and a communication layer which supports communications between the host driver module and the device driver module (Heil: col 10/lines 66-col 11/lines 11, 45-53, Fig. 2 element 240)).

Regarding claim 8-10 this claim is substantially the same and/or has been addressed as claim 3, 5, 6, respectively same rationale is applicable;

Regarding claim 11, the combined teachings of Heil and Angelo, as discussed above, further teach, wherein said system driver module and said device driver module constitute a single device (Heil: col 4/lines 3-4) that is operable independent of the host operating system and operable at any different host computer (i.e. portable) across a plurality of operating systems and host network platforms (Heil: col 4/lines 13-29), and works interoperably with a plurality of storage devices and operating systems (Heil: col 4/lines 4-20).

Regarding claim 12, the combined teachings of Heil and Angelo as discussed above, further teach, wherein said system driver module and said device driver module operate in accordance with an Intelligent Input/output (I<sub>2</sub>O) specification for allowing storage devices to operate independently from the operating system of the host server on which is running on (Heil: col 10/lines 43-50, col 4/lines 21-29).

Regarding claim 13, this claim is substantially the same and/or has been addressed as claim 2, same rationale is applicable

Regarding claim 14, the combined teachings of Heil and Angelo as discussed above, further teach a driver configuration of a host server (Heil: col 3/lines 66-col 4/line 29, elements 117, 126) for exporting local storage device access onto a computer network (Heil: col 3/lines 21-49), comprising: an input/output platform (IOP) (150) arranged to control an array of local storage (118) devices (Heil col 4/lines 3-20); and a host system driver module (Heil: col 9/lines 34-64, col 3/lines 61-col 4/line 29) comprising: a Local Transport (180) arranged to provide an interface to said input/output platform (IOP) (Heil: col 4/lines 3-20); a Remote Transport (181) arranged to provide an interface to said computer network (Heil: col 4/lines 21-29); and a connection means arranged to establish connection services with remote servers on said computer network and coordinate functions responsible for creating a direct call path between the Local Transport and the Remote Transport to provide access to the local storage devices (Heil col 10/lines 66-col 11/line 11, 45-53).

Regarding claim 15, the combined teachings of Heil and Angelo as discussed above, further teach wherein said input/output platform (IOP) supports at least one or more input/output processors (Heil: Fig. 1, element 100, 117.1, 118, 117, for shipping resources from local storage device col 6/lines 64-col 7/line 15, 51-56, device driver means: col 10/lines 28-50), and comprises: a device driver module which interfaces the local storage devices for controlling said array of local storage devices (Heil: col 9/lines 27-48); and a communication layer which defines a mechanism for communications between the system driver module and the device driver module (Heil: col 10/lines 66-col 11/line 11, 45-53).

Regarding claim 16, this claim combines limitations from claims 10-9 and 6-15, same rationale is applicable;

Regarding claim 17-18, this claim is substantially the same and/or has been addressed as claim 11-12, same rationale is applicable

Regarding claim 19, the combined teachings of Heil and Angelo as discussed above, 19, wherein upon initialization, said Local Transport scans the local bus so as to locate and initialize all local input/output platforms (IOPs) (Angelo: col 5/lines 1-17) and builds an opaque "context" structure for each input/output platform (IOP); (Heil: col 12/lines 9-col 13/line 3, col 11/lines 36-65, col



12/lines 9-19, Fig. 3, col 12/lines 8-59, and building a descriptor structure for each IOP which includes an exported directory table having function call; col 13/lines 5-15, address pointer, col 12/lines 9-col 13/line 13), wherein said Remote Transport prepares to accept requests from a remote server through said computer network (Heil: managing, means to take, a request for a service connection from said remote server on said system network (col 11/lines 36-53, col 12/lines 9-19, Fig. 3); and wherein said Connection Manager queries said Local Transport so as to determine the number of input/output platforms (IOPs), builds an IOP descriptor structure for each input/output platform (IOP) which includes an exported table of function call pointers and the context required by the Local Transport to communicate with the input/output platform (IOP) (Heil: col 11/lines 53-col 65, col 13/lines 5-15, address pointer and characteristic parameters col 12/lines 9-col 13/line 13), and finally establishes a network management communication channel through the Remote Transport, which waits for an external connection from said remote server on said computer network for exporting local device access onto said computer network using said direct call path between the Local Transport and the Remote Transport (Heil: col 10/lines 28-65).

Regarding claim 20, the combined teachings of Heil and Angelo as discussed above, wherein said Local Transport further has a send means and said Remote Transport further has a receive means which are respective program interfaces for receiving an receiving message from a remote server on said computer network for direct access to local input/output platform and for delivering an sending message to said remote server on said computer network (Angelo: receiving means: col 2/lines 4-14, col 2/line 66-col 3/line 10, 41-48, sending means, col 3/lines 11-21).

Regarding claim 21, the combined teachings of Heil and Angelo as discussed above, further teach means for building an IOP connection structure including at least an IOP descriptor pointer which refers to the IOP descriptor structure of the connection means for making a direct call to the Local Transport through the receiving means and the sending means (Heil: col 9/lines 4-26, handling I/O call means col 9/lines 27-32, building content directory means: col 12/lines 9-col 13/line 3).

Regarding claim 22, the combined teachings of Heil and Angelo as discussed above, further teach. a process of shipping, transferring abroad (i.e. exporting) storage device access resource onto a computer network (Heil: col 3/lines 21-49, col 4/lines 3-50) using an input/output platform (IOP)

access module of a host server (Heil: col 6/lines 34-64, col 3/lines 61-col 4/line 29), comprising the steps of: providing an interface to an input/output platform (IOP) supporting an array of storage devices (Heil: col 4/lines 3-20); providing an interface to a remote server on said computer network (col 4/lines 21-29); establishing service connection between said host server and said remote server on said computer network in response to a request from a remote server on said computer network (Heil: col 8/lines 24-49, Fig. 3, connection means); and providing a direct call access to said storage devices for said remote server to share resources of said storage devices while bypassing operating system protocol stacks (Heil: col 10/lines 28-65, Angelo abstract).

Regarding claim 24, 25, 26, 27, 28 this claim is substantially the same and/or has been addressed as claim 4, 5-6, 11-12, 20 and 19, respectively same rationale is applicable

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Beatriz Prieto** whose telephone number is **(703) 305-0750**. The Examiner can normally be reached on Monday-Friday from 6:30 to 4:00 p.m. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's Supervisor, **Mark H. Rinehart** can be reached on **(703) 305-4815**. The fax phone number for the organization where this application or proceeding is assigned is **(703) 308-6606**. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is **(703) 305-3800/4700**.

Any response to this action should be mailed to:  
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or faxed to:

(703) 308-9051, (for formal communications intended for entry)  
Or:  
(703) 305-7201 (for informal or draft communications, please label  
"PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Fourth Floor (Receptionist), further ensuring that a receipt is provided stamped "TC 2100".

(51)

B. Prieto  
Patent Examiner  
March 11, 2001

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**LE HIEN LUU**  
**PRIMARY EXAMINER**